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Title: Strength of palm kernel oil-based polyurethane foam/resin as alternative method for ground improvement

Author (s): Nastasa Abdul Samat, Ismacahyadi Bagus Mohamed Jais, Diana Che Lat, Bahardin Baharom and Mohd. Azwan Salleh

Abstract: Polyurethane has widely been used as a ground improvement for several years. The advantages of using polyurethane in ground improvement cannot be denied. Polyurethane foam is a very flexible and lightweight material which is so useful to increase the strength of soil. Polyurethane are used as grouting material in order to remediate settlement and uplifting the effected structure especially foundation to initial position. However polyol that used for polyurethane production are derived from petrochemical based. Concerns over petrochemical raw material volatility and non-sustainable material have caused the interest in substitutes the use of chemical based polyurethane to palm kernel oil-based polyurethane. This study perhaps can contribute to overcome those issues. Particularly, this study involves experimental work to evaluate the strength characteristic for different ratios of palm kernel oil based polyol to isocynate to form palm kernel oil based polyurethane (PKO-PU). The strength was tested using Unconfined Compression Test (UCT) for sample size of 50mm diameter and 100mm height. During mixing, expansions for every ratio were monitored. Stiffness and behavior for every ratio was then being analyzed using stress-strain curve. It is shown that, increasing in amount of polyol result in increasing the expansion but reduction in strength. PKO-PU shows rigid characteristics at the maximum strength which produce strong material, able to resist deformation but brittle beyond the maximum stress. Further increasing amount of polyol, PKO-PU shows flexible characteristic whereby it undergoes deformation but tend to elongate beyond the maximum stress. Higher stiffness and density recorded for rigid PKO-PU compared to flexible type PKO-PU.

Full Text

Title: Processing and materials efficiency in fused deposition modeling: A comparative study on parts making using ABS and PLA polymers

Author (s): Yopi Yusuf Tanoto, Juliana Anggono and Wesley Budiman

Abstract: There are a lot of materials available on market to make a 3D printing part, such as ABS, PLA, HIPS, PETG and others. On 3D printing product there are some responses that could be observe. Some of responses are processing time, mechanical properties dimension accuracy and others. This research is conducted to compare the ABS and PLA efficiency on fused deposition modeling process. Processing time and material consumption are the factor that used in this research to compare the efficiency between ABS and PLA. Processing time, and material consumption were the responses that were measured. The study reports that both of processing time and material consumption using ABS as a printing material was found more efficient compared with using PLA. Printing process using ABS was 2661 seconds, which was faster than using the PLA was 2808 seconds. For the material consumption, show that the average mass of ABS was 7, 33 grams compared with using PLA was 8, 17 grams. The estimated value of the Axon is always greater than the value of the time recording process and measurement of the mass printing result.

Full Text

Title: Regional validation of retracked sea levels from SARAL/AltiKa over the South China sea and adjacent seas

Author (s): Noor Nabilah Abdullah, Nurul Hazrina Idris, Nurul Hawani Idris, Muhammad Zulkarnain Abdul Rahman and Wan Hazli Wan Kadir

Abstract: This paper focuses on assessing the quality of sea level anomaly (SLA) data from the new generation of Ka-band SARAL/AltiKa satellite altimetry over the continental shelf of the South China Sea. The region consists of peninsulas, shallow seas, and small islands that produce complicated altimetric waveform patterns. The improved-accuracy of SLAs data from the MLE4, Ice1 and Ice2 retrackers which are provided in the AVISO-Sensor Geophysical Data Records (SGDR) were optimized in this study. The quality of retracked SLAs is assessed by making comparison with tide gauge data from six stations. In general, the percentage of data availability of Ice-1 retracker is superior (>68%) to those of MLE-4 and Ice-2 retrackers. The improvement of percentage (IMP) also shows that Ice-1 retracker improves the standard deviation >12% better than those of Ice-2 retracker. Over complex areas of Lubang and Ko Taphao Noi, the temporal correlation of Ice-1 retracker is superior ($r>0.80$) to those of MLE4 and Ice-2 retrackers ($r<0.84$). The root mean square error (RMS) error of Ice-1 retracker is the smallest (<10 cm) when compared to the other two retrackers over both regions. On the other hand, over Vung Tau, Geting and Bintulu, Ice-2 and MLE-4 retrackers have better correlations ($r>5.8$) and lower RMS error (<34 cm) than those of Ice-1 retracker. It can be concluded that the Ice-1 and Ice-2 retrackers were superior for the coastal region of Maritime Continent.

Full Text

Title: Preventing data collision by enhanced safety or alert message broadcasting strategy in vehicular Ad-Hoc network (VANET)

Author (s): R. Thenmozhi and S. Govindarajan

Abstract: A vehicular Ad-Hoc network (VANET) is a mobile Ad-Hoc network in which moving road vehicles are network nodes. The major problem faced in VANET is transmitting the safety message or an ALERT message between the vehicles to avoid collisions. The large number of vehicles moving in a particular area will cause the data congestion that results in a long delay on delivering the messages. Clustering the vehicles into groups is an efficient approach to broadcast the messages with a less delay and high delivering ratio. The performance of the clusters is greatly influenced by the selection of Cluster Heads (CHs). In this paper, the formation of clusters and cluster head selection is formulated as optimization problem in order to maximize the efficiency of the network energy and link quality. The formulated problem has been solved using two approaches: Density based Clustering and the cluster heads selection using Differential Evolution (DE) Algorithm. By combining these approaches the safety or Alert messages will be transmitted easily to all the vehicles by dynamically adapting transmission power and contention window size. The performance of the proposed ESMBS protocol is compared and evaluated against the existing AdvB and CBAPA protocols.

Full Text

Title: Obtaining of Nb-16Si spherical powders alloy for additive technologies by mechanical alloying and spheroidization in electric arc discharge thermal plasma

Author (s): Aleksei V. Grigoriev, Nikolay G. Razumov, Anatoly A. Popovich and Andrey V. Samokhin

Abstract: Nb-16Si (at. %) powder alloy was prepared by mechanical alloying (MA) in a planetary ball mill (Fritsch Pulverisette-4) from pure elemental powders. For the process of Nb-16Si powder spheroidization an experimental plasma generator based on thermal plasma arc generator with vortex discharge stabilization was used. Experimental results show that Nb-16Si spherical powder with a high degree of spheronization using starting powder fractions of +45-71 μm and +71- 100 μm can be prepared in a stream of argon thermal plasma with hydrogen additives generated in plasmatron. It is shown that the main peaks in the X-ray graph after MA correspond to a solid solution of niobium with a cubic lattice and the parameter a = 0.333 nm, as well as niobium silicide Nb5Si3 with a hexagonal lattice (P63/m) a = 0.7536 nm and c = 0.5249 nm. After spheroidization the hexagonal lattice of niobium silicide Nb5Si3 is transformed into a tetragonal lattice (I4/m) with the parameter a = 0.6557 nm and c = 1.186 nm. The other phase components remain unchanged.

Full Text

Title: Study on the effect of a variation types of gas, pressures and coupling sleeves on the performance of monopole plasma antenna

Author (s): Ahmad Nazri Dagang, Chan Xin Lei and Hajar Jaafar

Abstract: Plasma antenna is an antenna using ionized gas instead of metal as its conducting element. Plasma can be formed by energizing glass tubes which are filled with neutral gases. The main objective of this study is to investigate the effect of different gases, pressures and materials of coupling sleeve on antenna parameters of plasma antenna. Previous studies concentrate on using commercial fluorescent tube with unknown pressure as plasma antenna, and plasma ionization method using electroded discharge. This study investigates the parameters of plasma antenna with 4 different gases (neon, argon, argon-nitrogen and argon-mercury (fluorescent lamp)), 3 different pressures (1, 5, 10 Torr) and 2 different materials (copper and aluminium) for coupling sleeve. In this research, the simulation approach was conducted. The plasma tubes with constant length and diameter but different gas, pressures and coupling sleeve were designed. Actual tubes were used and energized using Dielectric Barrier Discharge (DBD) method in order to calculate plasma parameters. DBD was used as it can improve discharge lifetime. Antenna parameters were simulated using Computer Simulation Technology (CST) software with the resonance frequency is design in a ranged from 1 GHz to 10 GHz. Simulation results show that Ar (5 Torr) with aluminium coupling sleeve has the best performance in term of return loss by having the best value at -43.69894 dB. In terms of directivity and and parameters, fluorescent tube with copper coupling sleeve has the highest value compared to others, which is 3.376 dBi and 3.3 dB, respectively. The variation type of gas, pressure and coupling sleeve material gives different performance of plasma antenna.

Full Text

Title: Laser induced forward transfer of In2O3:ZnO: Au nanocomposite thin film for gas sensitivity application

Author (s): Farah T. M. Noori, N. D. Hamza and A. Kadhim

Abstract: Indium Oxide(In2O3) and Zinc Oxide (ZnO) nanoparticles were mixed carefully with gold nanoparticles which was synthesis by turkevich method with particles size ranged of (73.74 nm).Different concentration from these chemical compounds were used to preformed nanocomposite thin films of thickness of (250-300) nm by using spray pyrolysis method. The morphlogical properties were studied for all nanocomposite thin film samples with different concentrations. SEM results showed that all characteristics of samples in the nano scale. This work has been extended to study the FTIR properties, which included the transmission spectrum for all samples, the result showed two main broad metal oxygen bands. Finally the measurements of the gas sensor showed that the sensitivity increased when the gold nanoparticles concentration increasing.

Full Text

Title: Optimal power allocation to minimize ser for multi-relay decode-and-forward cooperative communication systems using EMA algorithm

Author (s): Rahmanian Koushkaki

Abstract: In the wireless environment, data transfer suffers from several problems such as the Multipath propagation, fading and limited range of transmitters. To solve these problems, a number of solutions have been developed that one of the newest and most efficient of them is cooperative communication techniques. In cooperative communications, one can gain a benefit from numerous advantages such as compensation or coverage of range limitation effects transmitters, overcoming fading and creating spatial diversity. Since most mobile units are fed by power limited batteries, optimal control and allocation of power in these networks is of particular importance. In this paper, a method for allocating a limited power the amount of which is determined by constraints is proposed in a cooperative system of multiple relay Decode and Forward to minimize the symbol error rate with M-QAM modulation using two methods EMA algorithm and Lagrange multiplier. Simulation results show that the symbol error rate performance is the same with both methods. Since the computational complexity of power allocation through Lagrange method, especially when there are a large number of relays, is high, EMA algorithm is an effective method for power allocation in cooperative networks.

Full Text

Title: Evaluate the image quality and the optimum aberration balance of the optical system with different apertures

Author (s): Ali H. Al-Hamadan, Ghada S. Karam and Abbas S. Al-Saedi

Abstract: The image of incoherently illuminated point object (point Spread Function) will be analyzed theoretically for imaging system with different apertures. Both free and defocused systems were considered. A new formula has been derived for determination of the PSF by integration over different square size pupil apertures. Our studies show that the optimum balance for square aperture with half diagonal =1 gives a best Strehl ratio, while the resolution of square aperture with area =p have a higher resolution, and the tolerance of the different aperture solved analytically.

Full Text

Title: Intelligent estimation of NOx emissions by flame monitoring in power station using Internet of Things

Author (s): Nallamilli P. G. Bhavani and K. Sujatha

Abstract: The scrutiny of combustion quality and its equivalent NOx emissions from flame images in thermal and gas turbine power plants is of immense significance in the realm of image processing. The principal goal is in detection, recognition and understanding of combustion conditions ensuring low NOx emissions. In this work, soft sensors using feed forward neural network trained with Back Propagation Algorithm (BPA) and Ant Colony Optimization (ACO) are used for flame image classification. The scheme uses the information from the color of the flame images as fundamental which is dependent on the combustion quality and NOx emissions. The initial gait is to describe a facet vector for each flame image including 10 feature elements. The distinctive attributes of the captured images is enhanced using curvelet transform. The perception of object (flame feature) recognition and classification of the flame image is conceded out to measure the flame

temperature, combustion quality and NOx emissions from the flame color. The samples including 51 flame images, parts of which are used to train and test the model. Finally, the entire samples are recognized and classified. Experiments prove this method to be effective for classification of flame images. The solution includes the Internet of Things (IoT) where the intelligent sensors are connected to the embedded computing system to monitor the fluctuation of parameters relating to combustion quality. This form is flexible and dispensable for the infrastructural environment that needs continuous monitoring, controlling and behavior analysis in power plants. The working performance of the proposed model is evaluated using prototype implementation, consisting of Arduino UNO board, intelligent sensors and MATLAB with Arduino hardware support package. The implementation is tested for monitoring the combustion quality with respect to the normal operating conditions which provide a feed control for NOx emissions monitoring to make the environment smart.

Full Text

Title: Analyzing object dimensions and controlling articulated robot system using 3D visionary sensor

Author (s): Wael R. Abdulmajeed and Alaa A. Hajr

Abstract: Visionary system has been played a significant role in industrial environment especially in controlling the movement of industrial robot from objects to targets. In this paper implemented visionary system for articulated robot system has been build 3D KINECT camera as visionary sensor linked with controller of articulated robot system (lab-volt robot model 5250). This work involves constructing integrated in MATLAB program automatically. It depends on a new approach in analyzing the robotic environment by a KINECT camera. The approach uses colors to detect and recognize the locations object and target. Dimensional properties of object and target (length and center) have been analyzed and calibrated location and orientations for object and target have been conducted. The visionary system shows agreed capability for detecting the location and controlling movement of the articulated robot from object to target with Minimizing errors.

Full Text

Title: Energy optimization in wireless sensor network using NSGA-II

Author (s): N. Lavanya and T. Shankar

Abstract: The rapid growth in wireless technology is enabling the variety of advances in wireless sensor networks (WSNs). By providing the sensing capabilities and efficient wireless communication, WSNs are becoming important factor in day to day life. WSNs have many commercial, industrial and telecommunication applications. The efficient use of available energy is one of the major issues in wireless sensor network. The battery life of sensor nodes should be long enough to decrease the maintenance cost. The multi objective evolutionary algorithms (MOEAs) are used for solving two or more objective problems. In this paper, we suggest nondominated sorting of solutions of multi objective problems using multi objective evolutionary algorithm (MOEA), called as nondominated sorting genetic algorithm II (NSGA-II). The primary objective of this paper is prolonging the lifetime of wireless sensor networks. The energy consumption in the network is optimized such that lifetime of network is increased. The simulation results show that NSGA-II provides better solution to select cluster head. The comparison of NSGA-II with well-known energy efficient algorithm LEACH shows, the proposed system can increase the network lifetime four to five times more than LEACH.

Full Text

Title: An improvised Power Quality of power grid using UPGC based on modified neural network

Author (s): Surya Srivastava and Jyoti Shrivastava

Abstract: The utility of synthetic intelligence is growing fast within the region of energy electronics and drives. The artificial neural Network (ANN) is considered as a brand new device to layout manipulates circuitry for Power Quality (PQ) gadgets. On this paper, the ANN-primarily based controller is designed for the cutting-edge control of the shunt active energy clear out and skilled offline the use of records from the traditional proportional-crucial controller. A digital-sign-processor-based totally microcontroller is used for the actual-time simulation and implementation of the control set of rules. An exhaustive simulation have a look at is executed to investigate the overall performance of the ANN controller and compare its performance with the traditional PI controller effects. The machine overall performance is also verified experimentally on a prototype version developed inside the laboratory.

Full Text

Title: Ezlaki Transform Homotopy perturbation method for temperature field of a fluid over a stretching sheet with uniform heat flux

Author (s): Vennila B.

Abstract: In this paper, the temperature distribution in the flow of a viscous incompressible fluid caused by the stretching sheet with uniform heat flux has been discussed. The combination of Elzaki Transform and Homotopy perturbation method is applied for finding the solutions. Series solutions for velocity and temperature distribution are achieved by this method, series solutions are obtained for the non linear equations caused by temperature field over a stretching sheet and the results are compared with the exact solutions, this method is seen as a better alternative method to some existing techniques for such realistic problems.

Full Text

Title: Adaptive video transmission over hybrid MIMO systems based on the PARAFAC model

Author (s): Martin D. Bravo Obando, Jesus D. Quintero Polanco and Jose de Jesus Salgado Patron

Abstract: A hybrid MIMO scheme for video transmission based on the PARAFAC model is presented. This hybrid scheme is built by modelling the received signal as a 3D array, or tensor, and the tensor decomposition known as PARAFAC is used for the recovery of the information in the receiver and the channel estimation. Additionally, two algorithms for video transmission that make use of the presented scheme are developed. The proposed algorithms were built based on the H.264/AVC and H.265/HEVC standards.

Full Text

Title: Design and implementation of embedded tracking system using spatial parallelism on FPGA for robotics

Author (s): Noor Aldeen A. Khalid and Muataz H. Salih

Abstract: The robot tracking system is one type of utilization system on a mobile robot and generally utilized as a part of numerous perspectives, for example, security or military. In this project, we implemented an active robot tracking system used FPGA platform. The robot can identify and track objects by using Infrared long range (IR). Perception approach and motion planning is the most essential part in this project. We used Two long range IR sensors for the tracking process and to distinguish any moving object while, the DE0-Nano board is the project platform and the characteristic of FPGA offer programmability and makes it easier to implement on different mobile robot platforms. We integrated Sensors with the DE0-Nano board. In our project a structure VHDL coding is used for design the robot tracking system and Quartus II 13.0sp1 as a development CAD tool. The implementation of complex tracking system with FPGA platform (DE0-Nano) was possible because of the rich logic elements, a specific sensors characteristics testing and robot stability was carried out to master those sensors and robot. The result for this project that already got, shown the frequency for DE0-nano achieved up to 1.3 GHz, also the total logic elements we used for this project is 4,022 and shown the output reading voltage of the IR sensor is high reflectivity for the white color object compared to another colors like blue and black, also the long detection distance.

Full Text

Title: upgrading experimental technological lines for obtaining bio-fertilizers from poultry biowaste

Author (s): Lyubov Sergeevna Dyshlyuk, Svetlana Yurievna Noskova, Lyudmila Konstantinovna Asyakina and Olga Olegovna Babich

Abstract: At this stage of work, a pilot line has been prepared for bioconversion of poultry waste with the optimum process parameters of temperature of 37°C, pH of 7.5 and duration of 12.0 hours, which includes the following: A conveyor for poultry waste; a disperser; a sterilizer; a nutrient medium mixer; a column for continuous sterilization of the nutrient medium flow; a holder heat exchanger; seed tanks; and an experimental fermentation reactor. The configuration of the process areas of the pilot line for biofertilizer production from poultry waste has been optimized, and three experimental batches of biofertilizers have been obtained in implementation of three equipment configurations. It has been found that all tested equipment configurations in the pilot line are capable of obtaining biofertilizers from poultry waste that meet the requirements of current normative documents in terms of physico-chemical, microbiological and safety criteria.

Full Text

Title: Fem modelling of human eye for investigating the thermal effects of tumour on the ocular surface temperature

Author (s): Sreethul Das and Monica Subashini M.

Abstract: Choroidal Melanoma is a type of eye tumor found in the Choroidal tissue. Tumor has a very high metabolic activity which raises the temperature of the tissues in its surrounding. The heat generated by tumor would tend to increase the temperature on the corneal surface of eye. This resulting thermal asymmetry and increase in temperature maybe used in the detection of tumour. The proposed method aims to find out the variation in temperature distribution on cornea's surface due to the presence of tumor. A 3D eye model had been developed for this study. Tumors of various sizes are introduced at different locations in the eye model. The effects on the corneal temperature with reference to a normal eye have been studied. The results indicate that the presence of tumors T2, T3 (maximum in size) can be detected by the proposed method, whereas the temperature variation in the corneal surface produced by T1 tumour (least in size) is not significant enough to be detected. This analysis proved that thermal imaging of the human eye is a promising method in the detection of Choroidal melanoma compared to the existing diagnostic techniques.

Full Text

Title: Multi-hop chain routing algorithm using a dynamic coordinator in Wireless Sensor Networks for minimum energy consumption

Author (s): Sukanya Varshini K., C. Jothi Kumar and P. John Paul

Abstract: Wireless Sensor Networks (WSN) comprise of a large number of sensor nodes that have very limited energy in them. The sensor nodes are deployed in certain places in order to monitor Temperature, Pressure, Sound and other environmental conditions also. Wireless Sensor Networks are widely used in various fields such as medical, industrial monitoring, military surveillance and much more. The nodes in the network need to transfer data continuously to the Base Station and they have very limited energy in them. As a result of which the energy of the nodes decreases as the data gets transferred. It is not an easy task to replace the batteries of the nodes at all times, hence energy efficiency plays a very important role in Wireless Sensor Networks in order to increase the lifetime of the nodes present in the network. This paper deals with the energy efficiency in Wireless Sensor Networks to minimize energy consumption of the nodes. The Multi-hop Chain Routing Algorithm using a Dynamic Coordinator (MCRA-DC) considers various factors like transmission distance, data volume that needs to be transmitted and the energy residue of the nodes to select the path for transferring data from the nodes to reach the Base Station (BS). This algorithm also ensures that the network is available for a longer time by a frequent update of the Cluster Head (CH) and the path to reach the BS. The proposed technique thus increases the entire performance of the network in aspects of increasing the lifetime of sensor nodes.

Full Text

Title: The hybrid method of path planning in non-determined environments based on potential fields

Author (s): Beloglazov D., Shapovalov I., Soloviev V. and Zargaryan E.

Abstract: In this paper, we describe the results of research on the planning of vehicle paths using a modified method of potential fields. A number of structural solutions for the modification of this method are proposed. In order to choose the most suitable solution, we carried out an analysis of the influence of various parameters of the method on its functionality. The concept of a local minimum of a virtual field is given as the main factor limiting the scope of using of artificial potential fields. Here we describe in detail and analyze the types of areas of local minima in which the path planning task cant be solved without modifying the method of potential fields. Based on the analysis results, an algorithm was developed for the getting vehicles out such areas using the ant optimization algorithm and virtual goals. The efficiency of this algorithm is confirmed by simulation of the process of vehicle motion in nondeterministic environments with extended obstacles of non-convex form.

Full Text

Title: Optimization of performance improvement of container crane at containers terminal using Genetic Algorithm

Author (s): Andi Hidayat Rizal, Harnen Sulistio, Achmad Wicaksono and Ludfi Djakfar

Abstract: This paper is describe as an effort to answer the performance improvement of container crane (CC) equipment in order to improve the performance of container terminals. One of the most important determinates of container handling efficiency is the productivity of container cranes. Optimization is done with the intention to find solutions to the performance of container crane equipment in container terminal operations. The research location is Surabaya Container Terminal and analysis is performed using Genetic Algorithms (GA). Optimization with randomize patterns is done through crossover and mutation in the GA method gives a value which fluctuates in each iteration. From the results of the analysis carried out, there are three (3) simultaneous suggestions to improve container crane performance so that the device operational service on the wharf can be optimized, namely a long wharf, the number of equipment in operation and coefficient of equipment. The decision to choose one of the options on the optimal iteration process needs to consider the conditions on container terminal today.

Full Text

Title: Back propagating tree to produce an optimal path to transmit data in a Wireless Sensor Networks

Author (s): K. Vimal Kumar Stephen and Mathivanan V.

Abstract: Wireless Sensor Networks (WSN) raises number of the challenges with regard to scalability and energy efficacy. Implemented of Huffman approaches one of the key variable length in the wireless sensor network is prolonging network lifetimes. To improve the lifetime of the sensor, static and movable mobile sinks are deployed. Movable sinks are used to receive sensed data from the sensor where it is located. Assigning prime number as the sensor node identity can be easily guessed by the intruder. Reusing the same identity in the cluster leads to compromising of nodes. The energy is retained when computation is reduced in cluster head thereby increases the life time of the particular cluster. Variable length gives variable length identity and avoids reusing of same identity hence it avoid network attacks such as random number length of nodes are not possible (No sensors are allowed inside the network without the knowledge of Cluster head). Increasing transmission range future will consume more battery power.

Full Text

Title: Gain doubling technique for multi-recycled folded cascode Op amp in deep submicron CMOS technology

Author (s): Mayur T. Kalkote and Ananiah Durai S.

Abstract: Many analog design techniques and methodology have been devised for better performance of amplifier. Now a day operational amplifier is the backbone of the analog and mixed signal device. It is fundamental block of the many design circuit that utilize high gain, high bandwidth, fast settling time. Op amp is one of the basic building block of analog circuit which has wide range of application such as biomedical application, ADC converter, switched capacitor filter. This paper presents the novel structure of folded cascode amplifier for enhancing the gain. In this quadruple-recycling folded cascode (QRFC) operational transconductance (OTA) amplifier is used to improve the performance over the conventional folded cascode (FC), double recycle, and improved recycle folded structures. The proposed structure uses positive feedback, cross coupled transistors which significantly improve its unity gain bandwidth, DC gain and slew rate as compared to others OTA structures. Circuit level simulations and analysis results done with 180nm CMOS technology validate the improved gain of 95dB for single stage fully differential mode and enhance bandwidth of 185.2 MHz.

Full Text

Title: Optimization of spectrum sensing in Cognitive Radio by demand based adaptive genetic algorithm

Author (s): Subhajit Chatterjee and Jibendu Sekhar Roy

Abstract: Contemporary wireless communication is administered by spectrum assignment policy and different measurement studies have proved it to be incompetent. In cognitive radio network, to enhance the utilization of radio spectrum, unused spectrum slots of licensed or primary users are sensed and used by secondary users. In Cognitive Radio spectrum sensing performance is more important. The most intelligent aptitude of a cognitive network is to alter the quality of service (QoS) parameters in the tune of the sensed parameters which is varying with time and geographical locations. In this paper, the QoS parameters of cognitive radio, like, bandwidth, signal to noise ratio (SNR), bit error probability (BEP), are optimized using multi-objective genetic algorithm (GA). This is adaptive and demand based optimization of cognitive radio parameters which adapts with the varying nature of available spectrum holes. Probability of detection and

probability of false alarm over a set of optimized SNR values are also optimized. The simulation results show that the proposed method gives better real life performance of the cognitive radio network than the generalized genetic algorithm approach.

Full Text

Title: Rotational oscillation of a cylinder in air flow

Author (s): A. N. Ryabinin and N. A. Kiselev

Abstract: The paper describes the experimental study of shielding effects of the disk placed coaxially upstream of a cylinder. It not only reduces the drag of the cylinder. The disk changes the dynamic characteristics of the cylinder. Without a disk, an elastically fixed cylinder in the airflow performs rotational oscillations with constant amplitude. A disk of small diameter, located near the cylinder, reduces the amplitude of rotational oscillation. Increasing the distance between the disk and the cylinder causes the damped rotational oscillations. The influence of the aerodynamic force on the damping of the oscillations depends on the disk diameter and the gap between disk and cylinder. A mathematical model is proposed for describing the rotational steady and damped oscillation of a cylinder with a disk.

Full Text

Title: Design and implementation an effective energy transfer system for powering the remote implantable biomedical devices

Author (s): Saad Mutashar, Bassam H. Abed, Jaber H. Majeed and Jawad K. Ali

Abstract: This paper deals with the design and implementation of an efficient sub-electronic circuit to power and transfer data to the remote bio-implanted devices. The proposed system is designed and implemented using ASK modulation techniques at 10 MHz operated frequency with modulation index 11.6 %. The system consists of a modified ASK modulator, a proposed self-tuning Class-E coil driver with 92.13% of efficiency and self-threshold cancellation voltage-doubling rectifier to generate a constant 1.8 DC voltage to power the implanted remote electronic circuits. The OrCADPspice 16.2 software using specter simulation with edit 0.35um CMOS process is used to validate the design. Whereas, the simulation results of the self-tuning Class-E coil driver is simulated with NI MULTISIM 11. For further testing and validation, an experimental hardware simulation is also presented using National Instruments NI circuits design suit (Virtual ELVIS 11) compatible with NILabVIEW.

Full Text

Title: Optimization of palmyra palm sap fermentation using co-culture of Saccharomyces cerevisiae and Pichia stipitis

Author (s): Tri Widjaja, Toto Iswanto, Elly Agustiani, Ali Altway, Belli Martha Judika Silaban and Li Felix Yuwono

Abstract: Palmyra palm sap whose main sugar components can be used for the food grade ethanol feedstock is potential to increase economic value. Therefore, its production process needs to be improved especially in fermentation process. This study aims to investigate the best condition of the fermentation of palmyra palm sap to be ethanol using co-culture of Saccharomyces cerevisiae and Pichia stipitisin different variables such as pH, initial inoculums and sugar concentration to get the best ethanol fermentation yield. The experiment was designed using statistical method which is Response Surface Methodology (RSM) and carried out in batch-wise with a working volume of 100 mL for 80 hours. The coefficient of pH and inoculum as a linear form and all quadratic coefficients have remarkable effect on the ethanol yield (P value < 0.05). The fit of model gave high value of R2 of 0.983, indicated that 98.3% of the variability in the response could be explained by the model. The highest ethanol yield was obtained 0.32 (g ethanol/g total sugar) with efficiency = 65.42% at pH 5.28, inoculums concentration of 6658612(cell.ml-1)/(g.l-1), and sugar concentration of 120 g/l.

Full Text

Title: Designing and modeling of compact microstrip antennas using new nanocomposite materials

Author (s): Mahdi Sharifi and Pejman Rezaei

Abstract: This paper is the first applied study on the designing and modeling of compact microstrip antennas using new polymer nanocomposite magneto materials. New materials used in designing and modeling process of compact microstrip antenna are iron oxide polymer nanocomposite magnetic materials. Polymeric nanoparticles materials are created by iron oxide nanocomposite materials based on polydimethylsiloxane (PDMS). Nowadays, several researchers have been proposed magneto materials for minimizing and increasing the antennas bandwidth. Nevertheless, properties such as high loss and decreasing control in magnetic properties prevent the optimal performance of antennas. In addition, the incompatibility and high complexity prevents integration of conventional magnetic materials with antennas and standard fabrication processes at printed circuit boards and wafer levels. Additionally, low losses in magnetic nanoparticles accompany by the ease of integration of polymer nanocomposites in standard fabrication processes, suggests solutions to resolve any of the complications and concerns. So the present paper aim was designing and modeling of multilayer compact microstrip antenna using new polymer nanocomposite materials. In this paper, one multilayer antenna was created using new polymer nanocomposite materials based on PDMS with two similar microstrip antennas with different iron oxide nanoparticle concentrations of 80% and 30% by weight. The results showed that the polymer nanocomposite magnetic antenna performance not only in the antennas with different operating frequencies were achieved but the use of new polymer nanocomposite materials related with factors such as bandwidth and antenna performance and miniaturization.

Full Text

Title: Boundary dominated flow in low permeability reservoir with threshold pressure gradient

Author (s): Jing Lu, Fu Dai and Freddy Humberto Escobar

Abstract: Due to the extremely complicated pore structures and strong fluid-rock interaction, fluid flow in low permeability reservoir does not obey Darcy's law. It is non-Darcy flow associated with threshold pressure gradient. Threshold pressure gradient (TPG) is the level of pressure gradient that has to be attained to enable fluid to overcome the viscous forces and start flowing. So, applying traditional well-testing theory in low permeability reservoir will lead to incorrect understanding of reservoir behavior; then, a new mathematical model for describing fluid flow in low permeability reservoir should be established. In non-Darcy flow in low permeability reservoirs, the fluid flow boundary is controlled by threshold pressure gradient and extended outward continuously as production goes on, while reservoir outside this boundary remains to original conditions. Once the moving boundary reaches physical reservoir boundary, it is called boundary dominated flow. This paper presents new mathematical models for boundary dominated flow under two different conditions: constant pressure boundary and closed boundary. Analytical solutions are obtained by using Greens' function with a numerical approximation. It is concluded that, during transient flow, the pressure derivative is not a horizontal line but a concave curve which goes upwards. The bigger threshold pressure gradient brings bigger flow resistance, so the slower pressure wave propagates, and the later boundary dominated flow starts. During boundary dominated flow, the pressure derivative is independent of threshold pressure gradient. A numerical simulation is carried out to validate the analytical solution and approves the validity of the analytical solution. The solution proposed in this paper provides a suggestive tool for well-testing in low permeability reservoir with threshold pressure gradient.

Full Text

Title: A pro-active fault tolerant Deadline Hit Count based scheduling in computational grid

Author (s): Gokuldev S., Sneha Jayabalan and Harshitha C. H.

Abstract: In grid systems, as the number of heterogeneous components increases in the networks, the chance of failure of resources increases. Identifying the various faults that occurs and imparting tolerance to those faults has become the principal area of concern. Many of the existing fault tolerant algorithms concentrate on increasing throughput and reducing the response time but consider less on increasing user satisfaction. The proposed fault-tolerant check-pointing based Deadline Hit Count (DHC) scheduling algorithm concentrates on increasing the efficiency of the resource through identifying the faults and reducing the turn-around time. It also increases the user satisfaction as it combines both the dynamic check pointing approach and fault tolerant scheduling. In the proposed technique, a DHC scheduling algorithm with check-pointing is implemented to identify and pro-actively tolerate faults to select the appropriate resources. Experiments are performed to assess the performance of the proposed approach using GridSim tool and have shown better performance.

Full Text

Title: Recent developments in durability of natural fibre cement/cementitious composites: A review

Author (s): S. Priyadharshini and G. Ramakrishna

Abstract: Natural fibre cement/cementitious (NFC) composites has been gaining popularity worldwide due to its potential applications in low cost construction activities. Though there is wide range of opening for NFC Composite, their long term performance (i.e. durability) under various exposure conditions is still a question with unsound answer. Many of the researchers have been working since several decades to overcome this particular issue by providing a right technology for making NFC composites, a really potential product under various applications. This critical review shows a torch on various mechanism of degradability of natural fibres (NF) and NFC composites under different exposure conditions, evaluation of durability of natural fibres and NFC composites, techniques adopted for enhancing durability of NF and NFC composites. The durability improvement is found to be superior with the composites containing cementitious material than in the plain fibre cement composites. Moreover, incorporation/use of modified fibres in the modified matrix shows better performance under durability testing. However, many more studies need to be progressed to confirm the present developments on durability of NFC composites.

Full Text

Title: Finite element analysis of the behavior of rc beams during fires

Author (s): Mazen Musmar, Anis Shatnawi and Nasim Shatarat

Abstract: A detailed 3-Dimensional time domain transient thermal stress finite element analysis was carried out to study the performance of reinforced concrete beams exposed to fire attack. A FE model that represented a reinforced concrete beam continuous over one support was developed. The beam was subjected to ASTM E119 standard fire exposure to the bottom and side surfaces, in the form of transient temperatures versus time, while maintaining constant transverse loading on top surface. Material nonlinearity was taken into account because of the changes in material properties experienced in fire. The more complicated aspects of structural behavior in fire conditions, such as thermal dilation, cracking or crushing of concrete, and yielding of steel were modeled. The validation of the applicability of the FE model was illustrated by comparing the finite element solution with the results of experimental testing carried out for similar RC beams within the same boundary conditions. The FE analysis showed that a reinforced concrete flexural member properly designed to fail in flexure at ambient conditions, would experience the same mode of failure when exposed to realistic fire exposures.

Full Text

Title: Latency aware IPv6 packet delivery scheme based battery-free WSN

Author (s): S. Pradeep, Atluri Ramakrishna and Kakarla Vamsikrishna

Abstract: This working environment gives a diagram of the present best in class of the RFID innovation in the Tuner Sensor Network (WSN) field. The distinctive RFID decisions are depicted with their advantages and disadvantages. The advantage and limitation of electric battery - free individuals radio collector detecting component in light of RFID innovation are displayed. In this way, the paper portrays the outline of an UHF RFID incorporated circuit intended to gather and store the power from an entrance RF motion in requesting to arrangement Low power simple or advanced locator. Without battery radio correspondence, surgical process for mechanical observing gadget utilizing the planned IC has been exhibited by actualizing two remote sensors that screen both temperature, utilizing a thermistor, and weight, utilizing a business computerized sensor. This work gives a diagram of the present best in class of the RFID connected science in the Receiving set Sensor Network (WSN) field. The advantages and impediments of siege - free radio set detecting components in view of RFID innovation are displayed. In this manner, the paper portrays the development of an UHF RFID incorporated boundary intended to reap and stores the power from an approaching RF motion all together of extent to supply low power simple or advanced finders. The National Intelligence Community has been executed utilizing a minimal effort 0.35µm CMOS technique and it joins a serial production fringe gadget interface (SPI) keeping in mind the end goal to speak with the sensor. Without battery, remote operation for mechanical checking utilizing the planned IC has been shown by executing two remote sensors that screen both temperature, utilizing a thermistor, and weight utilizing a business advanced sensor.

Full Text

Title: An overview of existing evaluation metrics for 3D mesh segmentation

Author (s): Khadija Arhid, Mohcine Bouksim, Fatima Rafii Zakani, Mohamed Aboulfatah and Taoufiq Gadi

Abstract: The evaluation of mesh segmentation has received a great deal of attention since 3D mesh segmentation is an essential step in many mesh operations. For this reason, notable efforts have been made towards a better evaluation of mesh

segmentation methods, and one of the most popular works is the benchmark of Chen et al., which allows a quantitative evaluation of mesh segmentation algorithms. Based on the given data sets, which comprise manual and automatic segmentations, many evaluation metrics have been proposed recently. In this context, we present in this study an overview of the existing similarity metrics and new ones proposed in our previous works addressing the problem of evaluating 3D mesh segmentation by describing each method and giving an extensive study and experimental comparison of them.

Full Text

Title: Linear and nonlinear predictive control algorithms applied to a heated tank system

Author (s): Diego F. Sendoya-Losada and Johan Julian Molina Mosquera

Abstract: In this work a number of model based predictive controllers have been designed in order to regulate a (nonlinear) heated tank system. First, two controllers according to the EPSAC algorithm were designed, one with fixed and one with variable time delay. This algorithm requires a linear model, so the model was linearized around a certain equilibrium point. This gives bad results when the set point lies far from the equilibrium output temperature. The results obtained with a variable delay are better than when the time delay is assumed to be constant. Secondly, a NEPSAC controller was designed. A big advantage is that no linearization is required. Consequently, a correct model is available at each point. This explains why NEPSAC gives the best results of all controllers: a low settling time, no overshoot and equally good results for all set points. The influence of the prediction horizon was also investigated. A higher value for the prediction horizon results in a calmer system because the controller takes into account more future values. There are less fluctuations in the input and the output converges with less overshoot, but slower. Finally, the NEPSAC controller was tested on the real heated tank system. The tests show that despite a faulty model and a high sensitivity to noise, the controller still gives surprisingly good results. These are comparable to the simulation results. It can be concluded that the NEPSAC controller is very robust.

Full Text

Title: Developing a new features approach for color food image segmentation

Author (s): Salwa Khalid Abdulateef, Massudi Mahmuddin and Nor Hazlyna Harun

Abstract: Image segmentation technique was widely used in pattern recognition to estimate calories. However, the process of segmentation multi-food images is more difficult. In this paper, segmentation of color food images for segmenting food images is proposed. The segmentation technique segments food image into two regions: foreground and background. In addition, it can separate between food items in the plate. In this article, a new features based on k-means algorithm are developed for food image segmentation. The results show that the proposed segmentation technique based on A, B and neighbors features has been achieved successfully segmented food images with preserving significant features and removing the background.

Full Text

Title: Identification, assessment and improvement of collapsible soils: Case of tufas soils of Casablanca- Morocco

Author (s): K. Ouatiki, L. Bahi, L. Ouadif, A. Bahi and S. Amgaad

Abstract: Collapsible soils correspond to metastable soils that can exhibit a large change of volume due to wetting with or without extra loading. Consequently, they are susceptible to cause significant deformations at their saturated state, which represent real challenges to geotechnical professions. In fact, numerous soils can fall in the category of collapsible soils but contrariwise, they can show at the same time high degree of stability and can support heavy loads under their natural water content. The present research aims to suggest a method to conduct when collapsing behavior is detected in materials used during geotechnical projects, based on three parameters: potential of collapse, thickness of layers and stress level. To do so, we conducted experimental work included Atterberg limits, Particle size analysis (sieving and sedimentation) and Value of Methylene blue to a group of five undisturbed specimens obtained in the city of Casablanca. They have approximately similar characteristics: tend to vary from slightly plastic to medium plastic, mostly made of fine grains with a wide distribution of particles and have a small value of fineness modulus. The low dry density, and the high void ratio and stiffness characterizing the five undisturbed tufas samples Had lead us to elaborate an oedometric test without changing the initial water content, and then we had recorded the settlement once the equilibrium reached when the soils were wetted till saturation under a stress of 60 KPa, 100 kPa, 140 kPa, 200 kPa and 240 KPa. Assuming that every infrastructure work has its critical collapse potential that can be admitted, and in light of the oedometric test

results, we can improve the serviceability and reduce the cost and the frequency of rehabilitation by either reducing the support section without making any change to the thickness of the layer or deepen the tread with maintaining the one dimensional compression.

Full Text

Title: Development of an Expert System Algorithm for diagnosing cardiovascular disease using Rough Set Theory implemented in MATLAB

Author (s): Aaron Don M. Africa

Abstract: Cardiovascular disease refers to conditions that involve narrow or blocked blood vessels. This disease when remained untreated may lead to a heart attack. When a person has a cardiovascular disease, the heart may not be able to pump enough blood to the body. When there is insufficient blood the brain or other organs may become damaged. Cardiovascular disease is challenging to diagnose because its symptoms may be mistaken for other diseases. Early detection, if a person has cardiovascular disease is a big advantage in combating the ailment. This is because diagnosing the disease early may reduce the complications it may bring. This research will develop an Expert System Algorithm for the diagnosis of cardiovascular disease. This research will guide the person diagnosing the disease to provide the appropriate recommendation. The Rough Set Theory will be used to reduce the rules so it can be easily diagnosed. This research will utilize the Statlog Heart Data Set of the UCI machine learning repository. Matrix Laboratory or MATLAB will be used to implement the system.

Full Text

Title: Variational iteration transform method for solving burger and coupled burger's equations

Author (s): Ali Al-Fayadh and Hasan Ali Khawwan

Abstract: In this paper, Variational iteration transform method is employed to determine the exact solution of the Burger equation which 1-dimensional and coupled Burger's equations nonlinear partial differential equation. This method is combined form of the Laplace transforms and Variational iteration method. The explicit solutions obtained were compared the exact solutions. The method finds the solution without any restrictive assumptions and free from round-off errors and therefore reduce the numerical computation to a great extent. The method is tested on two examples and coupled Burger's equations. The results show that new method is more effective and convenient to use and high accuracy of it is evident.

Full Text

Title: Using GIS and SWAT model for hydrological modelling of Oued Laou Watershed (Morocco)

Author (s): Ilias Semlali, Latifa Ouadif, Khadija Baba, Ahmed Akhssas and Lahcen Bahi

Abstract: In Morocco, study and water resources management in a watershed faces several challenges that make it more and more difficult. These challenges are mainly linked to the topography of the area, climate change and poor land use. In order to meet these challenges and to ensure the rational and efficient management of water, it is Necessary to use and develop spacial and physical hydrologic models to allow as easily and realistically as possible a simulation of the functioning of watershed systems. This study consists in using a Geographic Information System (GIS) for Hydrological Modeling based on a GIS model (SWAT Model) in order to perform an overview of the study area (Watershed of Oued Laou), and also to demonstrate the impact of climat change on soil geology, its proporties and on the watershed's water resources. Our study area covers a surface of 930 km² stretching over the Haut Rif mountains. This area is characterized by zones of steep slopes and different climates, which makes the soil favorable for landslides and erosion phenomena. This study has allowed us to come up with a water balance of the study area and to model water circulation while based on climate data, soil types and land-use in the study area.

Full Text

Title: Iterative parallel genetic algorithm for detecting communities in social networks

Author (s): Nikhil K. S., Ambika B. and M. V. Judy

Abstract: A social network is basically a graph where nodes or vertices represent users/actors and links or edges represent the relationship among the actors. Analysis of social networks, especially community detection, is a continuously evolving research area. Genetic algorithms have been proven to be a fruitful method for detection of communities in social networks but the user time taken to detect these communities in large scale networks is quite considerable. In this paper, we enhance a simple genetic algorithm with optimum population size, mutation rate and selection strategy by parallelizing with MapReduce architecture for detecting quality community structures in a shortened time frame. We have used an enhanced framework for MapReduce which increases the performance of the genetic algorithm in a distributed environment. The result shows that the iterative parallel genetic algorithm (IPGA) converges to the optimized solution faster than the traditional method.

Full Text

Title: Sustainable vest -pocket parks as an effective tool in sustainable urban design-Egypt

Author (s): Farrag Nermin Mokhtar and Ibrahim Vitta Abdel Rehim

Abstract: With the rapid increase in population and the enlarged accumulation of buildings in Egypt, green areas shrunk, to reduce the share per person much less than in developed countries which led to appearance of several environmental and social complications. In view of the current existing design of the small spaces between residential units, they suffer from poor design and high cost, making them less popular. The research purposes to achieve sustainability in designing spaces between residential units (vest -pocket parks) and to recognize remarkable local and international experiences to comprehend and discover the advantages and disadvantages, as well as comparing the cost of construction with traditional materials and methods and the use of some methods that decrease the cost in the long term and achieve sustainability. The research furthermore seeks the participation of users and the Designers throughout constructing and implementing a questionnaire. The research ends with the selection of an open space between residential units (Zahraa Al Helmiya City- Helmiya El Zatoon-Cairo) as a case study to acquire a sustainable design as an effective tool in sustainable urban design.

Full Text

Title: A new equivalent circuit of the three-phase induction motor: A case study on current and power factor of the motor

Author (s): Zuriman Anthony, Erhaneli Erhaneli and Busran Busran

Abstract: Characteristics of the three-phase induction motors can be analized by using a conventional equivalent circuit. The parameters of the circuit can be obtained through of several experiment's results in the laboratory such as dc test, no-load test, and blocked-rotor test. All data must be gotten accurately if they are used for predicting the characteristics of the three-phase induction motor. If one data is not gotten accurately, the characteristics of the motor can not be predicted accurately. This study is purposed to give a simple equivalent circuit for analyzing the characteristics of the 3-phase induction motors by using only the nameplate and the no-load test data of the motor. So, the blocked-rotor test and dc test of the motor are not required for the purposed circuit. This study is focused to discuss about the line current and power factor of the three-phase induction motor. The object used in this study was the 3-phase induction motor of 1.5 HP, 380/220V, Y/?, 2.7/4.7 A, 4 poles, 50 Hz, 1400 RPM. The results of this study show that the equivalent circuit proposed in this study can be used to predict the characteristics of the three-phase induction motor, especially the input current and power factor of the motor with an accurate rate above 90%.

Full Text

Title: Pneumatic actuator as vertical dynamic load simulator on the suspension mechanism of a quarter vehicle wheels

Author (s): Simon Ka'ka, Syukri Himran, Ilyas Renreng and Onny Sutresman

Abstract: Most of all road damage can be caused by dynamic loads of vehicles that fluctuate according to the type of vehicle that passes. This study aims to calculate the vertical dynamic load of the vehicle actually which occurs on road construction after through the vehicle wheel suspension mechanism. The Pneumatic cylinder that was driven by pressurized air directly weighs on the Spring and Shock Absorber that contained on the wheels of the vehicle. The load fluctuations of the medium weight category vehicle are determined by the regulation of the amount of pressurized air entering into the pneumatic cylinder chamber pushing the piston and connecting rods. The deviation that occurs during compression on the spring and Shock Absorber is substituted into the vehicle dynamic load equation by taking also the magnitude of the spring stiffness constant, and the fluid or gas coefficient of the damper. The results showed that the magnitude of the displacement when the compression force worked has significantly influenced the amount of vertical dynamic load of the

vehicle that overlies the road construction. Experimental results using pneumatic actuators instead of real dynamic vehicle loads illustrate the characteristics of the relationship between work pressure and dynamic load. If the working pressure of P2 (bar) is given great, the vertical dynamic load Ft (N) which overloads the structure of the road is also greater. From the graph shows that shock absorbers have greater ability to reduce dynamic load vertically when compared to spring ability.

Full Text

Title: An effective fault tolerance method for collaborative editing with fickle operations

Author (s): G. Sekar and V. Vasanthraj

Abstract: Collaborative editing refers to the editing groups which produce work products as the collection of individual contribution. We present an implementation model on how to increase fault tolerance for collaborative editing systems with fickle operations. Some of the recent research revealed that collaborative editing systems were constructed by the Conflict free Replicated Data Types (CRDT). This new approach is shown to avoid the fault on the every user's replicas updates that should not affect the owner's document. Every user can update their own document with some updates. At the end, all the updates were transferred to the owner's original document. In some case some of the user's replica can update with some mismatch updates that can also be reflected on the owner's document. So these updates badly reduce the reliability and integrity of the collaborative systems. The mismatch updates and the faults cause the whole document lead to lessen its integrity and quality. In this paper, we carefully analyze, find the mismatch updates and the replica's faults towards this type of systems and reduce the fault tolerance. We define algorithms to find such fault mismatch and remove that fault replica. Then we produce the original document without any fault updates.

Full Text

Title: Energy balance cascaded multilevel inverter for photovoltaic application

Author (s): A. Santhi Mary Antony, D. Ramya and D. Godwin Immanuel

Abstract: Energy balance cascaded multilevel inverter for photovoltaic application. It is used for less no of power switches, losses, installation area, voltage stress and converter cost. It is also used for solar energy that is connected to the micro grid system. It reduces the transformerless operation and improves the power quality. Ability to operate in both symmetrical and asymmetrical mode is analyzed. The results are done with cascaded H bridge (CHB) and flying capacitor (FC) multilevel inverters. The simulation is done with Matlab Simulink.

Full Text

Title: Power quality improvement for wind power system with DFIG using Predictive Direct Power Control scheme

Author (s): Chellammai C. T. and Mohamed Ghouse S.

Abstract: A new control technique is proposed in this work for efficient operation of DFIG (Doubly Fed Induction Generator) operating in unbalanced condition of grid voltage using Model Predictive Direct Power Control (MPDPC) along with a power compensator. In MPDPC method, a controlled system model predicts the imminent behavior of the system over a long range to regulate the direct reactive and active powers in the stator instantaneously. Also, MPDPC selects the appropriate rotor voltage vector which has least ripples using an optimization cost function. Then, power compensation scheme generates power references to MPDPC without the amputation of negative sequence components of the stator current. The proposed method reduces the distortions in the stator currents and eliminates the electromagnetic torque oscillations. The effectiveness of the proposed control algorithm is realized in Matlab/Simulink and the dynamic response of the controller in improving the power quality is studied.

Full Text

Title: Investigation of the Dielectrophoresis effect on the electrical performance of dielectric liquid

Author (s): M. H. S. Zainoddin, H. Zainuddin and A. Aman

Abstract: This paper addresses the effect of the contaminant presence in the power transformer oil. This transformer oil has been used as liquid insulation as well as heat dissipation in high voltage transformer. Recent, researchers have found that ester oil which vegetable-based oil are capable of outshining the disadvantages of mineral oil such as non-biodegradable and future scarcity as a potential replacement as liquid insulation. However, the performance of ester oil is still arguably, especially in DC energization case. In this present paper, bridging experiment has been conducted in order to study the performance of ester oil with the presence of contaminant under the influenced of DC electric field. This approach will show the effect of polarization and Dielectrophoresis (DEP) that create a conduction path between two different potential paths in the electric field and producing motion in the particles. As an effect of DEP, the contaminant tends to move towards the higher region electric field and may lead to a more serious problem, transformer failures. In total, Cellulose particle with two different conditions, i.e. stirred and unstirred were investigated. A complete cellulose bridge is observed between two 13 mm sphere electrodes with 10 mm distance between them. The performance of dielectric properties is analyzed by correlating the formation time and breakdown voltage results.

Full Text

Title: A study on performance of 11 KV overhead polymeric and porcelain insulators under contaminated conditions

Author (s): Rajamohan Jayabal and Vijayarekha K.

Abstract: In recent decades, overhead insulators play a major role in electrical distribution system for transmitting power through transmission line over long distances owing to its high insulation strength. Nonetheless under contaminated conditions, insulation strength decreases due to rise in pollution levels of environment. Hence, it is required to check the ability of the insulator by artificial test approaches in polluted situations. This paper deals with the performance on high voltage 11 kV rated overhead insulators of polymer and porcelain type under contaminated conditions based on IEC 60805. Insulators are contaminated with suitable proportions of NaCl and applied uniformly on the surface. In this study, tests are carried out on insulators under power frequency to check for the withstand voltage test, lightning and switching impulse withstand voltage tests with negative impulses. It is clear from the experiments done on the insulators that flashover occurs at lesser voltages when the pollution level is high which in turn increases conductivity. The relation between leakage current and applied voltage, under different fixed levels of pollution is observed.

Full Text

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PROCESSING AND MATERIALS EFFICIENCY IN FUSED DEPOSITION MODELING: A COMPARATIVE STUDY ON PARTS MAKING USING ABS AND PLA POLYMERS

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ABSTRACT

There are alot of materials available on market to make a 3D printing part, shuch as ABS, PLA, HIPS, PETG and others. On 3D printing product there are some responses that could be observeb. Some of responses are processing time, mechanical properties dimension accuracy and others. This research is conducted to compare the ABS and PLA efficiency on fused deposition modeling process. Processing time and material consumption are the factor that used in this research to compare the eficiency between ABS and PLA. Processing time, and material consumption were the responses that were measured. The study reports that both of processing time and material consumption using ABS as a printing material was found more efficient compared with using PLA. Printing process using ABS was 2661 seconds, which was faster than using the PLA was 2808 seconds. For the material consumption, show that the average mass of ABS was 7,33 grams compared with using PLA was 8,17 grams. The estimated value of the Axon is always greater than the value of the time recording process and measurement of the mass printing result.

Keywords: fused deposition modelling, ABS, PLA.

INTRODUCTION

Increasing the effectiveness of product development is a requirement in industries. There are three effectiveness criteria for a design process; they are quality, product cost and time to market [1]. Currently there are a lot of technologies and method that are developed to help a designer to make an effective design process. One of them is rapid prototyping (RP). RP is a technique that commonly used to create a data computer aided design (CAD) into 3D form with 3D printing technology additive manufacturing. [2]. At first, RP was used in automotive and aerospace industry, but now it is used in many other industries [3]. Three-D Printing, which is one form of RP that makes the product or design development process becomes faster.

In the product development, there are many types of 3D printing technology, such as fused deposition modeling (FDM), film transfer imaging (FTI), stereolithography, laminated object manufacturing (LOM), selective laser sintering (SLS), etc. [2]. From those various types of technologies, RP is the most commonly used in FDM. Nearly half of RP machines that were introduced to the market are FDM [5]. In FDM, a thermoplastic filament is extruded through of a heated die [3]. Currently, there are a lot of choices of materials available on the market for FDM 3D printing including Nylon, polycarbonate, HIPS (high impact poly styrene), ABS (acrylonitrile butadiene styrene), PLA (poly-lactic acid), and others [6]. Of those many materials, ABS and PLA is the most frequently used. These materials offer properties which make them useful for making a varied object and each of them has been used in the manufacture of additives for some time [4].

Studies on 3D printing process parameters and materials particularly using FDM technology have been investigated by several researchers. Raut *et al*. presented an investigation on the effect of built orientation on mechanical properties and total cost of FDM parts. They calculated the volume of the printed ABS covert to total cost [7].Other research groups like Wittbrodt *et al.* studied the effects of PLA color on material properties of 3D printed components. Results are presented showing a strong relationship between tensile strength and percent crystallinity of a 3-D printed sample and a strong relationship between percent crystallinity and the extruder temperature [8]. Tanoto *et al.*, have studied the effect of printing orientation on the processing time, dimension accuracy, and tensile strength. They were printed using ABS polymer. The study reports that the printing process with third orientation was the fastest printing process [9]. Third orientation is the printing orientation that has the most layers with a minimum raft. This orientation has the processing time 2432 seconds followed by another orientation of 2688 and 2780. However that work has not reported the efficiency of material usage as a result of the printing orientation.

In the industry, the use of materials is also a factor of efficiency calculation. Comparison of PLA and ABS material which is the most commonly used material is needed especially in terms of material usage and time is not there yet. In other to close the gap, comparative study on processing and materials efficiency on parts made of ABS and PLA polymers using FDM was carried out to study in this research.

EXPERIMENTAL METHOD

Materials used in this research were 1 kg BFB (Bits from Bytes) ABS and PLA polymer filaments with 3 mm diameter (Figure-1). The color for ABS was white and for PLA was green. ABS is a popular plastic that widely

used in households appliances and toys [10]. PLA has also been widely used by operators of 3D printing or model maker. Melting point of PLA is relative low, 150-160^{0}C, thus requiring less energy to print with the material. Compared with ABS, PLA has been shown to be a safer alternative, from toxic potential [8]. There werre five simple steps to make a 3D printing part using FDM, i.e. drawing a 3D CAD model, converting it into STL format, slicing of STL format, builtding part in layer by layer then finally cleaning and finishing [11].

3D CAD software was used to drawing a 3D CAD and converting it in to STL format. For slicing of STL using Axon V2. Specimens were fabricated using the BFB 3D Touch Double machine (Figure-1).The specimens (Figure-2) were produced while FDM printing process.Specimen dimension according toASTM D638-14was used as reference dimension(115 x 19 x 4 mm)[12]. Input parameters for layer thickness used were 0.5 mm with 50% fill density. Infill was built in lattice patterns. Setting of extrusion temperature was used as recommended by the manufacturer, i.e. 180-220^{0}C.

The processing time was observed either using time record by Axon and as well recorded it using a stopwatch. Upon setting the parameters on built setting, Axon was able to show the estimates of the printing process in built progress (Figure-3 and Figure-4). The built progress obtained estimated printing time and material mass extruded. Estimated printing time and mass extruded are the overall time and a mass to make a specimen including the raft and support. When extruder began to extrude the material, the starting time was recorded. The ending was recorded when the extruder finished the printing process. The weight of the material used during FDM process was measured either by mass data recorded by Axon as well as weighed the samples using AND digital scale with capacity 1200 gram x 0.1 gram.

Figure-1. BFB Touch double printer machine.

Figure-2. Specimen printing orientation.

RESULTS AND DISCUSSIONS

Axon estimates

The printing orientation used in this study, there was only one raft, mean while the support was not needed because there are not a hanging segment from the specimen. In this orientation, the specimen was sliced to thickness. Specimen thickness is 4 mm and layer thickness is 0.5 mm so that this specimen has 8 layers. From the built progress, it could be seen that the time used to process ABS was faster (48 minutes or 2880 seconds) compared to the the time needed for PLA (52 minutes or 3120 seconds). In term of mass of ABS used was 9.1 grams and mass of PLA used was less, i.e. 8.7 gram. Those data indicates that processing time of ABS material was more efficient compared with the processing time using PLA material. Interestingly, less processing time with more use of material with ABS compared with the use of PLA material.

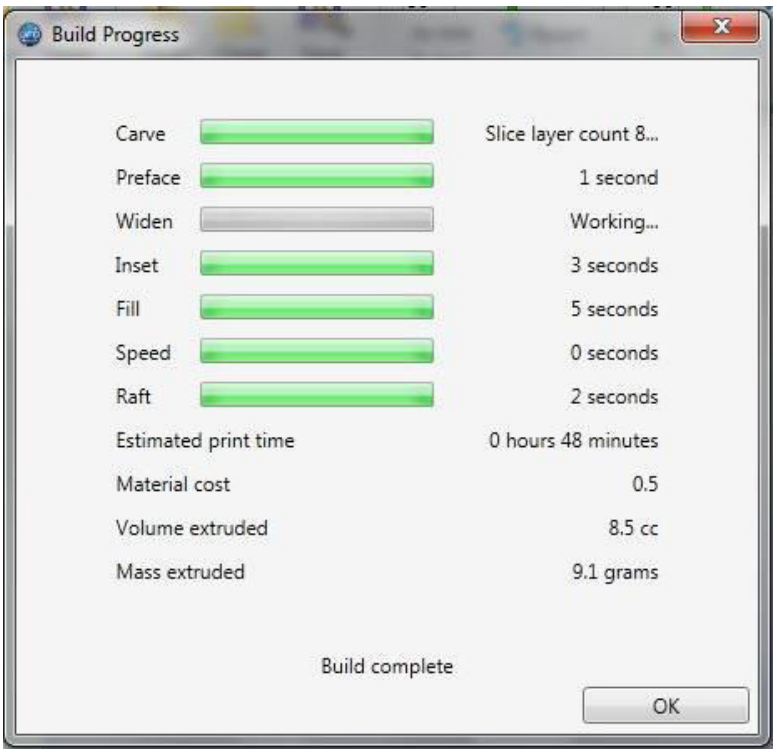

Figure-3. Axon build progress result for ABS.

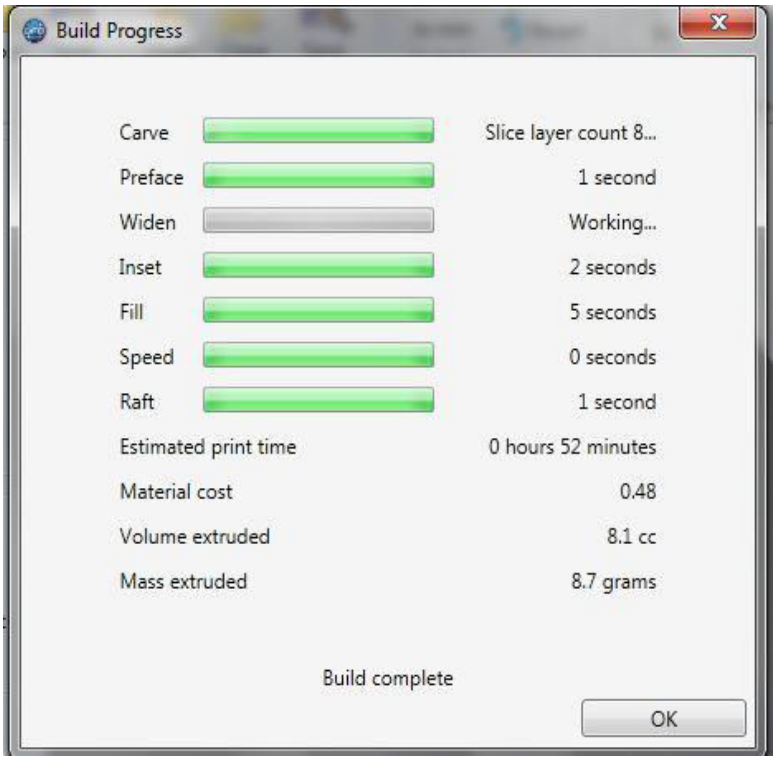

Figure-4. Axon build progress result for PLA.

Comparison in processing time

The processing time recorded during the printing process of 3 specimens using a stopwatch can be seen in Table-1. From those data, they show that the average processing time from the printing process using ABS (2661 seconds), which was faster than using the PLA (2808 seconds). It can be seen in Figure-4 that the time recorded using stopwatch was in line with the time estimation by axon.Those data also shows that the time estimation from axon was always longer than the printing process itself. Printing using ABS resuls in processing time 1.08 times longer than recorded using stopwatch

result. In the case of PLA, the time estimation from Axon was 1.11 times longer from stopwatch. The longer time obtained from Axon was due to the time estimation include the time of the heating process of the materials in the extruder. From these data we can see that for time aspect, making a 3D print products using ABS material more efficient. Axon accuracy rate in predicting time to process ABS is 92.4% and 90% for PLA.

Table-1. ABS and PLA processing time in seconds.

Specimen	ABS	PLA
1	2672	2805
2	2657	2814
3	2654	2806
Average	2661	2808

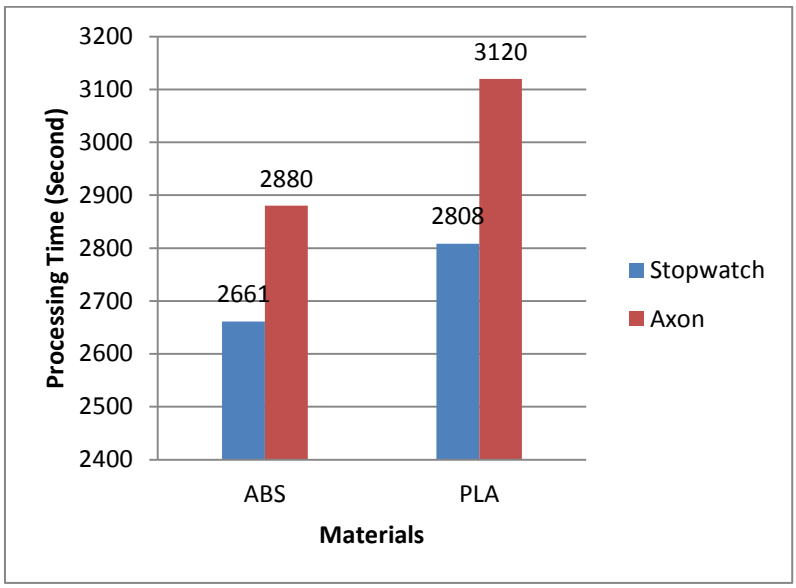

Figure-5. Comparative of processing time of ABS and PLA.

Comparison in mass extruded

The mass of three specimens printed was measured using digital scales and their data can be seen in Table-2. The mass data show that the average mass of ABS was less (7,33 grams) compared with using PLA (8,17 grams). Figure-4shows that the measurement of mass using digital scales contradicts from the mass estimation from Axon. The use of ABS was less than the usage of PLA from mass data measured using digital scales. TheAxon estimates the mass of ABS use was more compared to PLA. Mass measurement done using the digital scales in line with the physical properties of ABS and PLA. ABS has smaller density, i.e. 1.05 g/cm^3 compared to PLA, i.e. 1.2 g/cm^3 [13,14].Both of the processing time and the printing mass obtained from estimation by Axon were found higher than the same results recorde using stopwatch and mass measurement using digital scale. In the case of ABS, estimation of Axon was obtained 1.24 times heavier than the measurement using digital scales. On PLA, the estimation of Axon 1.06 times heavier than the measurement with digital scales. From that data, it can be seen that in term of material consumption, using ABS material was more efficient. On PLA, the difference of the real value compared with the estimated value was 0.53 gram;therefore the axon accuracy rate was 93.3%. i. On ABS, the difference from the real value compared with the estimated value was 1.77 grams. Thereforethe axon accuracy rate of 80.5%.

Table-2. Mass of ABS and PLA time in gram.

Specimen	ABS	PLA
1	7.3	8.1
2	7.4	8.2
3	7.3	8.2
Average	7.33	8.17

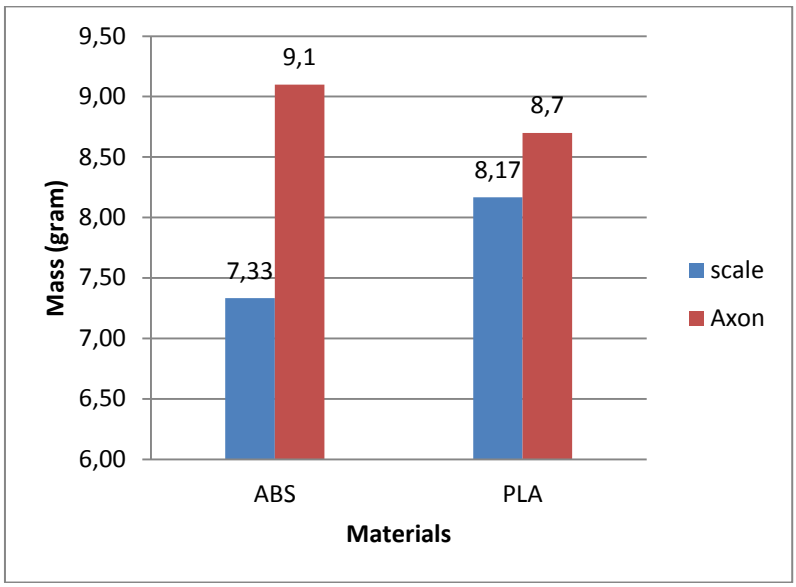

Figure-6. Mass comparative of ABS and PLA.

CONCLUSIONS

Both of processing time and material consumption using ABS as a printing material was found more efficient compared with using PLA. The estimated value of the Axons that have the highest accuracy is to estimate the mass of PLA (93.3%), estimating the processing time material ABS (92.4%), estimating PLA processing time (90%) and estimating the mass ABS (80.5%) respectively. The estimated value of the Axons is always greater than the value of the time recording process and measurement of the mass printing results. For the next research, need to be examined also from other aspects, whether ABS better than PLA. Another aspect is that include the dimensional accuracy and strength of the product.

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